

SEMICONDUCTOR DEPOSITION APPARATUS AND SHOWER HEAD

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ABSTRACT OF THE DISCLOSURE

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A deposition apparatus and shower head are provided. The shower head preferably includes a plurality of plates having gas paths formed therein. A cooling system is arranged in a lower plate of the shower head and includes a plurality of independent inner cooling lines configured to connect coolant inlets to coolant outlets. A separating device is also disclosed herein. The separating device preferably separates a heater stage from a chamber body to thereby separate a processing chamber of the deposition apparatus from a dead volume located beneath the heater stage. Various other improvements are also provided to improve the efficiency of a deposition process, and, in particular, an ALD process.